Recovery and valorisation of ancient varieties grown in high-altitude vineyards of the Spanish Pyrenees

Estaún, Luis[1]; Lacasta, Yolanda[1]; López-Vicente, Manuel[2]; García, Sergio[3]; Piñero, Marta[4]; Navarro, Ignacio[5]; Guasch, Ernest[6]; Gracia, Pilar[6]; Gogorcena, Yolanda[2]

1 Ayuntamiento de Biescas, Plaza Ayuntamiento 1, 22630 Biescas, Huesca, Spain

2 Laboratory of Genomics, Genetics and Breeding of Fruit and Grapevine, Estación Experimental de Aula Dei-Consejo Superior de Investigaciones Científicas*, Zaragoza, Spain

3 Centro de visitantes Parque Nacional de Odesa y Monte Perdido, Avda Ordesa s/n, 22376 Torla-Ordesa, Huesca, Spain

4 Mimate S.L., Calle el Tinte 1, local 2, 22630 Biescas, Huesca, Spain

5 Asociación de elaboradores de vinos y licores del Pirineo – BEBE Pirineo, Pol. Industrial Las pasaderas Sur, Nave 7, 22630 Biescas, Huesca, Spain

6 Bodegas Bal Minuta S.C.P., C/Baja 7, 22637 Barbenuta, Huesca, Spain

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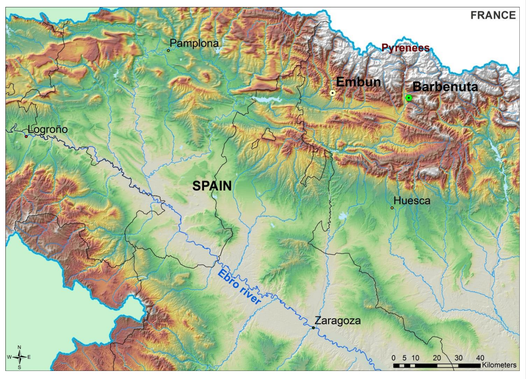
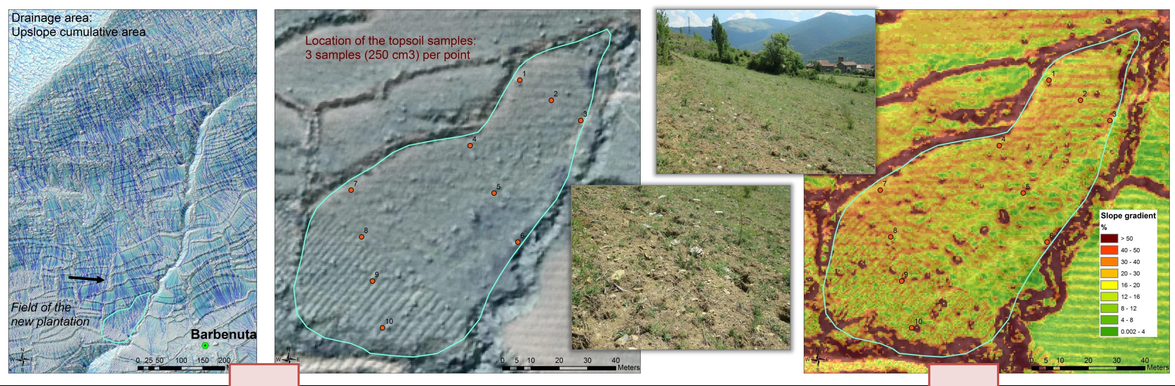
1. Introduction

- This project aims to **recover ancient grapevine varieties** in the Biescas area (Huesca, Spanish Pyrenees), after studying its molecular profile and agricultural and oenological potentials.
- To expand the commercial vineyard, a **new plantation** (ca. 6300 m^2) is planned in a currently abandoned field located near the recovered village of Barbenuta. Due to the **mountainous climatic conditions** (high rainfall erosivity) and the high slope gradient of the field and the drainage area (> 20 %), the processes of **water soil erosion** and **hydrological connectivity** (HC) will be studied by means of field assessments and numerical modelling. The aggregated index of HC (AIC; [1]) will be run before and after plantation establishment. Patches of forestry areas, high walls and stone walls are frequent and influence on the runoff pathways.
- This initiative aims to **recover abandoned fields**, to identify ancient varieties. The achievement of these goals will allow a better transfer to the sector of the wines coming out of high altitude and will be of interest for the **sustainability of the local economy** (Figure 1).



2. Materials and methods

- **Leaves and grapes** of the different varieties have been collected in the commercial vineyards near Barbenuta. Representative accessions of known varieties, such as *Garnacha Tinta*, *Cabernet Franc*, *Pinot Noir* or *Riesling* [2], as well as, 'unknown' genotypes will be included for the oenological study.
- **Grape berry determinations** (ºBrix, pH, TA, Malic acid, anthocyanins and total phenols) will be conducted at the Associate unit EEAD-ICVV-UNAV (*).
- Standard **microvinification** assays will be carried out in **Bal Minuta Cellar** to identify the varieties with the greatest capacity to produce wines with differentiating sensory characteristics in terms of their colour, flavour and aroma properties to transmit to the wine specific and novel aromas.
- 30 **topsoil samples** (250 cm^3 per sample) were collected in 10 sampling points.
- Two **Digital Elevation Models** are used at 0.5 (yr. 2018) and 0.2 m (yr. 2019) of spatial resolution to **simulate HC before and after the new plantation**.



Objectives

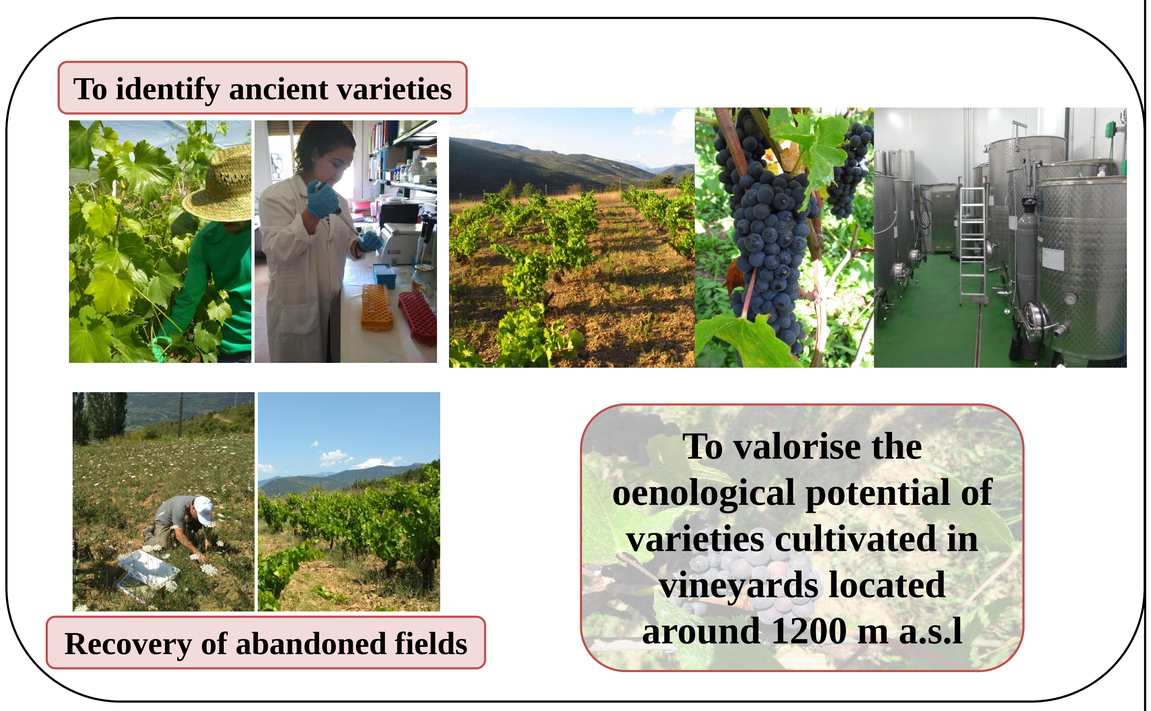


Figure 1. Main objectives of the project.

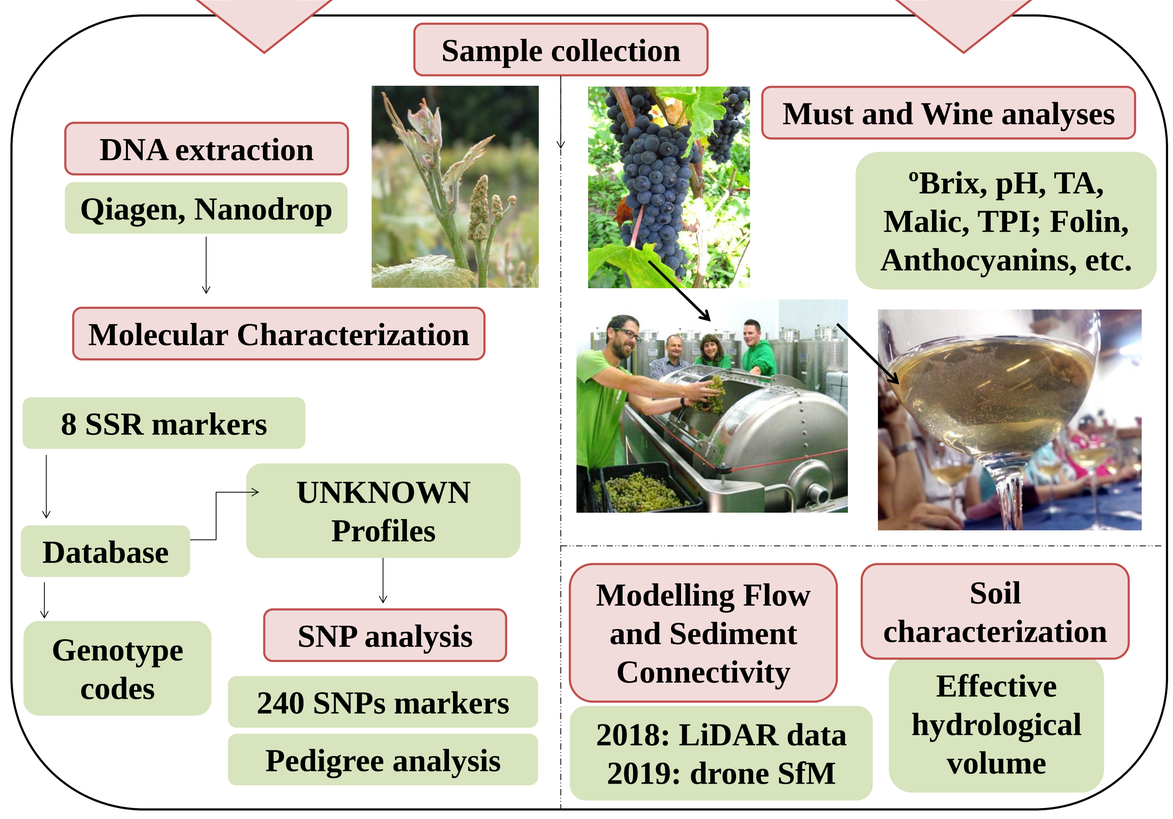


Figure 2. Schematic representation of the main activities to be carried out. Leaves, grapes and soil samples have been collected in vineyards near Barbenuta (Huesca, Spain).

3. Results and discussion

3.1 Molecular characterization

- The molecular characterization of unknown accessions has been carried out in the EEAD with 6 microsatellites: VVMD5, VVMD7, VVMD27, VVS2, ZAG62 and ZAG79. The identification still in progress indicates that some varieties have genotypes included in our database while others have unknown genotypes [2]) .
- Further studies for UNKNOWN genotypes, based on the SNP profiles will be performed at ICVV-CSIC to study trio compatibility (parents-offspring) and duo compatibility (parent-offspring) using *Cervus 3.0* software (Field Genetics, London, UK).

3.2 Must and wine analysis. Field assessments and Modelling

- The first harvest of known and unknown varieties has finished in October 2018 and must and wine analyses are in progress.
- Simulation of the current scenario of HC is in progress. The Structure-from-Motion (SfM) DEM is planned to be carried out at the end of the winter (before budding out) with the company 3D-scanner Patrimonio e Industria.

Acknowledgements

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References-Links

[1] López-Vicente, M., Ben-Salem, N., Computing structural and functional flow and sediment connectivity with a new aggregated index: A case study in a large Mediterranean catchment. *Science of the Total Environment*, 2019, **651** (Part 1), 179-191.

[2] Buhner-Zaharieva, T.; Moussaoui, S.; Lorente, M., Andreu, J.; Núñez, R., Ortiz, J.M.; Gogorcena, Y., Preservation and molecular characterization of ancient varieties in Spanish grapevine germplasm collections. *American Journal of Enology and Viticulture*, 2010, **61** (4), 557-562.

https://www.researchgate.net/project/Recovery-and-valorisation-of-ancient-grapevine-varieties-grown-in-high-altitude-Tierra-de-Biescas-Huesca-Short-title-Vinos-de-Altura

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